

We claim:

1. A medical device for electrical stimulation of neural tissue and controlled drug delivery comprising:
 - an implantable drug delivery module which comprises a plurality of reservoirs, a release system contained in each of the reservoirs, wherein the release system comprises at least one drug, and a control means for selectively releasing a pharmaceutically effective amount of the drug from each of the reservoirs;
 - a neural electrical stimulator which comprises a signal generator connected to at least one stimulation electrode for operable engagement with a neural tissue of a patient; and
 - at least one microcontroller for controlling operational interaction of the drug delivery module and the neural electrical stimulator.
2. The medical device of claim 1, wherein the at least one microcontroller controls both the signal generator and the control means of the drug delivery module.
3. The medical device of claim 1, further comprising a power source.
4. The medical device of claim 1, wherein the stimulation electrode is on an outer surface of a hermetically sealed encasement containing the drug delivery module and microcontroller.
5. The medical device of claim 1, wherein the stimulation electrode extends a distance from a hermetically sealed encasement containing the drug delivery module and microcontroller.
6. The medical device of claim 4, wherein a flexible catheter connects the stimulation electrode to the encasement.
7. The medical device of claim 1, wherein further comprising telemetry components in operable communication with the microcontroller.

8. The medical device of claim 1, wherein the neural electrical stimulator is provided as a module separate from the drug delivery module.
9. The medical device of claim 8, wherein the neural electrical stimulator module is implantable.
10. The medical device of claim 8, wherein the drug delivery module is controlled by a telemetry or hard-wired signal from the stimulator module.
11. The medical device of claim 8, comprising two microcontrollers, one of which controls the stimulator module and the other which controls the drug delivery module.
12. The medical device of claim 1, for treating chronic pain in a patient.
13. The medical device of claim 1, for treating a movement disorder in a patient.
14. The medical device of claim 1, for treating incontinence in a patient.
15. The medical device of claim 1, for treating obesity in a patient.
16. The medical device of claim 1, for controlling seizures in a patient.
17. The medical device of claim 1, wherein the drug delivery module comprises a microchip drug delivery device.
18. The medical device of claim 1, wherein the control means for selectively releasing a pharmaceutically effective amount of the drug comprises a reservoir cap positioned over each reservoir and a means for actively disintegrating the reservoir cap.

19. The medical device of claim 18, wherein the reservoir cap is electrically conductive and the means for actively disintegrating the reservoir cap comprises an input lead and an output lead each connected to the reservoir cap and a power source for delivering an effective amount of electrical current through the reservoir cap, via the input lead and output lead, to heat and rupture the reservoir cap to release the drug.

20. The medical device of claim 1, further comprising one or more sensors operable to deliver a signal to the microcontroller.

21. The medical device of claim 20, wherein the one or more sensors control release of the drug from the drug delivery module and control generation of an electrical current from the neural stimulator to neural tissue.

22. The medical device of claim 1, wherein the drug is an analgesic, an anti-anxiety agent, an anti-incontinence agent, a skeletal muscle relaxant, an anti-convulsant, or an anti-parkinson agent.

23. A method of treating a patient comprising delivery of an electrical signal and at least one drug to a patient in need thereof comprising:

implanting into the patient the implantable drug delivery module of the medical device of claim 1;

bringing the stimulator electrode into operable engagement with a neural tissue of the patient;

activating the signal generator to deliver electrical stimulation from the stimulator electrode to the neural tissue of the patient; and

releasing the drug from the reservoir into the patient.

24. The method of claim 23, wherein the drug and the electrical neural stimulation are delivered simultaneously.

25. The method of claim 23, wherein the drug is delivered intermittently or continuously.

26. The method of claim 23, wherein the electrical stimulation is delivered intermittently or continuously.
27. The method of claim 23, wherein the drug is released before the electrical neural stimulation and is effective to reduce the stimulation threshold of the neural tissue.
28. The method of claim 23, wherein release of the drug is alternated with the delivery of the electrical stimulation.
29. The method of claim 23, wherein the neural electrical stimulator is provided as a module separate from the drug delivery module.
30. The method of claim 29, further comprising implanting the neural electrical stimulator into the patient.
31. The method of claim 23, for treating chronic pain in the patient.
32. The method of claim 23, for treating a movement disorder in the patient.
33. The method of claim 23, for treating incontinence in the patient.
34. The method of claim 23, for treating obesity in the patient.
35. The method of claim 23, for controlling seizures in the patient.